

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed July 28. Claims 1 – 4, 6, 8 – 16, 18 – 24 and 33 remain pending. In particular, Applicant has amended claim 9. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

Rejections under 35 U.S.C. 101

The Office Action indicates that claims 9 and 12 - 16 stand rejected under 35 U.S.C 101 because the claimed invention is not directed to statutory subject matter. As set forth above, Applicant has amended claim 9 and respectfully asserts that the rejections have been accommodated.

Rejections under 35 U.S.C. 112, First Paragraph

The Office Action indicates that claims 1, 4 – 9, 12 – 17, 20 – 24 and 33 stand rejected under 35 U.S.C 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Office Action contends that support can not be found for the limitations added in Applicant's last amendment. Applicant respectfully traverses the rejections.

In this regard, Applicant's disclosure teaches the following:

Through the inventive method, *the carrier transfer sub-routes can be produced dynamically* in the regular process operation route, the first and second process operations, reducing dependence on manual operation. The disclosed method also accomplishes the goal of saving storage space operation data. As an example, if the regular production route requires 1000 operations and 10 carrier transfer operations, then a total of 10000 operations must be stored in the database by conventional methods. *The inventive method, however, produces the carrier transfer sub-routes dynamically, requiring only a database to store the*

1000 operations of the regular production route and another database to store the 10 carrier transfer operations, enhancing the efficiency of data management.

(Specification at page 5, lines 6 – 21). (Emphasis added).

Based upon the above teaching, three aspects of Applicant's invention are evident. First, the carrier sub-route is produced dynamically. Second, such a carrier sub-route is produced dynamically by accessing two values; namely, operations of the regular production route (i.e., "first information corresponding to process operations") and carrier transfer operations (i.e., "second information corresponding to carrier transfer operations"). Third, the representative example described above involves storing 10,000 values in a database corresponding to 10,000 operations. In contrast, Applicant's describe dynamically producing the same 10,000 operations using only 1010 stored values, i.e., 1000 stored values corresponding to operations of the regular production route and 10 stored values corresponding to carrier transfer operations. Clearly, one of ordinary skill in the art understands that the 1000 stored values corresponding to operations of the regular production route must be correlated with the 10 stored values corresponding to carrier transfer operations in order to produce 10,000 results as described in the above passage. Thus, Applicant respectfully asserts that the specification describes the claimed invention in a manner that fulfills the requirements of 35 U.S.C. 112, first paragraph. Therefore, Applicant respectfully requests that the rejections be withdrawn.

Applicant's disclosure also provides further teachings in support of the claimed invention.

In particular, the following also is disclosed:

Fig. 7 is a diagram showing execution of the carrier transfer sub-route. In another embodiment, a system of automatic carrier transfer is established. ***An administrator 700 or a program 704 can execute a data verification procedure 702 and produce a carrier transfer sub-route 708.*** In addition, an operator 706 can trigger the carrier transfer sub-route 708 if necessary. ***The data verification procedure verifies the data between the***

operating wafers 716 and the MES database 710. The MES database 710 may refer to other database 712. If the verification result requires wafer lots to be split and transferred, the carrier transfer sub-route first splits the wafers 716 and then transfers the split lots to the different carriers 722, 724. The carrier transfer sub-route can be executed in a stocker 718 and an embedded sorter 720. After the carrier transfer sub-route, the original wafers (Lot A.00) 716 are split into two different carriers 722, 724, with different Lot IDs (Lot A.00, Lot A.01). The empty carrier 714 will be filled with the split lots through the carrier transfer sub-route. Lot A.00 722 and Lot A.01 724 may be applied to different processes for subsequent process operations.

Thus, a method of automatic carrier transfer is provided by the invention. The disclosed method produces a carrier transfer sub-route dynamically to achieve the production automation, presenting significant advantages in IC foundries.

(Specification at page 10, lines 13 – page 11, line 11). (Emphasis added).

Clearly, the aforementioned passage provides additional support for the aspect of Applicant's invention involving correlation of two types of information, i.e., the data verification procedure verifies the data between the operating wafers 716 and the MES database 710. For at least this additional reason, Applicant respectfully requests that the rejections under 35 U.S.C. 112, first paragraph, be withdrawn.

Rejections under 35 U.S.C. 112, Second Paragraph

The Office Action indicates that claims 1, 4 – 9, 12 – 17, 20 – 24 and 33 stand rejected under 35 U.S.C 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. to comply with the written description requirement. Specifically, the Office Action contends that it is unclear how the terms "carrier transfer operations" and "carrier transfer sub-route" differ. Applicant respectfully traverses the rejections.

In this regard, Applicant's disclosure teaches the following:

Through the inventive method, the carrier transfer sub-routes can be produced dynamically in the regular process operation route, the first and second process operations, reducing dependence on manual operation. The disclosed method also accomplishes the goal of saving storage space operation data. As an example, if the regular production route requires 1000 operations and 10 carrier transfer operations, then a total of 10000 operations must be stored in the database by conventional methods. ***The inventive method, however, produces the carrier transfer sub-routes dynamically, requiring only a database to store the 1000 operations of the regular production route and another database to store the 10 carrier transfer operations, enhancing the efficiency of data management.***

(Specification at page 5, lines 6 – 21). (Emphasis added).

Based on the foregoing, Applicant respectfully asserts that one of ordinary skill in the art, upon reading Applicant's disclosure, understands that a carrier transfer sub-route is a particular implementation of a carrier transfer operation at a designated regular production route operation. That is, a carrier transfer sub-route defines the occurrence of a carrier transfer operation at a particular portion of the production route. Thus, Applicant respectfully asserts that the specification describes the claimed invention in a manner that fulfills the requirements of 35 U.S.C. 112, second paragraph. Therefore, Applicant respectfully requests that the rejections be withdrawn.

With respect to the portion of this rejection related to the use of "correlating" in Applicant's claims, Applicant respectfully asserts that the use of such term is proper as set forth above in the discussion of the pending rejection under 35 U.S.C. 112, first paragraph. Therefore, Applicant respectfully requests that proper examination of the pending claims be undertaken, including consideration of the act of correlating as recited in the claims.

Rejections under 35 U.S.C. 102

The Office Action indicates that claims 1, 4-5, 7, 9, 12-13, 15, 17, 20-21, and 23 stand rejected under 35 U.S.C 102(b) as being anticipated by *Goerigk* (U.S. Patent No. 6,303,398). The Office Action also indicates that claims 1, 7 - 9, 15 - 17, 23, 24 and 33 stand rejected under 35 U.S.C 102(b) as being anticipated by *Sada* (U.S. Patent No. 6,174,375). Applicant respectfully traverses the rejections.

With respect to *Goerigk*, Applicant notes that *Goerigk* teaches a method to recognize identification marks on wafers or cassettes, and to communicate and store the recognized identification marks to a control system (col. 4, line 4-col. 5, line 45, *Goerigk*). *Goerigk*, however, does not teach to produce a carrier transfer sub-route of the wafers dynamically by accessing first information corresponding to process operations and second information corresponding to carrier transfer operations and then correlating the first information and the second information to generate the carrier transfer sub-route. This is in direct contrast to Applicant's pending claims as is described below.

With respect to *Sada*, *Sada* discloses:

Thus, the product names, the process names and the lot numbers are stored in the lot status memory 4. Also, the branch contents, the number of levels, the number of wafers and the wafer numbers are stored in the branch content memory 5. Further, the determination level is stored in the determination level memory 6.

The process controlling operation of the control circuit 2 is explained next with reference to FIG. 4.

First, at step 401, when one semiconductor device manufacturing equipment transmits lot information for the next lot, *the control circuit 2 determines whether or not the wafers of this lot should be branched. In this case, it is determined whether or not the product name, the process name and the lot number of the next lot are the same as those in the lot status memory 4.*

Only if it is determined that the wafers of this lot should be branched, does the control proceed to step 402 which transmits the branch content, the number of levels, the number of wafers and the wafer numbers from the branch content memory 5 via the LAN to the above-mentioned semiconductor device manufacturing equipment. Then, at step 403, the control circuit 2 transmits the determination levels from the determination level memory 6 via the LAN to the above-mentioned semiconductor manufacturing equipment. Then, the control proceeds to step 404. The process executing operation of one semiconductor device manufacturing equipment is explained next with reference to FIG. 5.

First, at step 501, it is determined whether or not the wafers of the next lot should be branched in accordance with the information transmitted by the control circuit 2. As a result, *if it is determined that the wafers should be branched, the control proceeds to steps 502, 503 and 505.* Otherwise, the control proceeds to steps 506 and 507.

At step 502, the wafers are divided into a plurality of groups by the CCD camera 13a with reference to the wafer numbers. Next, at step 503, different processes are performed upon the groups of wafers. For example, different ion implantation energies are used for the groups of wafers. Next, at step 504, different determinations are performed upon the groups of wafers. For example, different threshold voltage determinations are used for the groups of wafers. In this case, the results of the determinations are displayed as occasion demands. Next, at step 505, the wafers are merged into one group.

On the other hand, at step 506, the same process is performed upon all the wafers. For example, the same ion implantation energy is used for all the wafers. Next, at step 507, the same determination is performed upon all the wafers. For example, the same threshold voltage determination is used for all the wafers. In this case, the results of the determinations are displayed as occasion demands.

Then, the routine of FIG. 5 is completed by step 508.
(*Sada* at column 3, line 22 – column 4, line 11). (Emphasis added).

Based on the foregoing, several aspects of *Sada* are evident. First, branch content memory of *Sada* does not correlate to Applicant's "second information corresponding to carrier transfer operations." This is because branch content memory only includes the branch contents, the number of levels, the number of wafers and the wafer numbers. Second, although *Sada*

arguably accesses two databases, there is no teaching or suggestion in *Sada* regarding dynamically producing the carrier transfer sub-route as claimed. That is, there is no teaching in *Sada* to indicate that *Sada* involves anything more than accessing a previously stored set of carrier transfer sub-routes, such as described above in Applicant's disclosure involving the storing of 10,000 operations. This is in contrast to the limitations recited in Applicant's claims.

Referring now to claim 1, that claim recites:

1. A computer-implemented method of automatic carrier transfer, comprising using a computer to perform the steps of:
 - executing a data verification procedure after a first process operation of a plurality of wafers according to a manufacturing execution system database and obtaining a verification result, wherein the data verification procedure verifies the data between the wafers and the MES database;
 - dynamically producing a carrier transfer sub-route of the wafers according to the verification result by accessing first information corresponding to process operations and second information corresponding to carrier transfer operations and then correlating the first information and the second information to generate the carrier transfer sub-route;***
 - executing the carrier transfer sub-route of the wafers; and
 - executing a second process operation for the wafers.

(Emphasis Added).

Applicant respectfully asserts that neither *Goerigk* nor *Sada* is legally deficient for the purpose of anticipating claim 1. Specifically, Applicant respectfully asserts that neither *Goerigk* nor *Sada* teaches or otherwise discloses at least the features/limitations emphasized above in claim 1. In this regard, the Office Action indicates that *Goerigk* accesses one data set, whether that data set is stored in one large or two smaller databases. This is in direct contrast to the limitations recited in claim 1, in which two data sets, i.e., first information and second information, are accessed and then correlated to dynamically generate the carrier transfer sub-route. Additionally, although *Sada* may access two databases, the databases do not contain the information recited in claim 1 that is being correlated for the purpose of dynamically producing

the carrier transfer sub-route. Therefore, Applicant respectfully asserts that claim 1 is in condition for allowance.

Since claims 4, 5 and 7 are dependent claims that incorporate the features/limitations of claim 1, Applicant respectfully requests that the rejections be removed.

With respect to claim 9, that claim has been amended to recite:

9. A computer-readable storage medium for storing a computer program providing a method of automatic carrier transfer, comprising using a computer to perform the steps of:

executing a data verification procedure after a first process operation of a plurality of wafers according to a manufacturing execution system database and obtaining a verification result, wherein the data verification procedure verifies the data between the wafers and the MES database;

dynamically producing a carrier transfer sub-route according to the verification result by accessing first information corresponding to process operations and second information corresponding to carrier transfer operations and then correlating the first information and the second information to generate the carrier transfer sub-route;

executing the carrier transfer sub-route of the wafers; and

executing a second process operation for the wafers.

(Emphasis Added).

Applicant respectfully asserts that neither *Goerigk* nor *Sada* is legally deficient for the purpose of anticipating claim 9. Specifically, Applicant respectfully asserts that neither *Goerigk* nor *Sada* teaches or otherwise discloses at least the features/limitations emphasized above in claim 9. In this regard, the Office Action indicates that *Goerigk* accesses one data set, whether that data set is stored in one large or two smaller databases. This is in direct contrast to the limitations recited in claim 9, in which two data sets, i.e., first information and second information, are accessed and then correlated to dynamically generate the carrier transfer sub-route. Additionally, although *Sada* may access two databases, the databases do not contain the information recited in claim 9 that is being correlated for the purpose of dynamically producing

the carrier transfer sub-route. Therefore, Applicant respectfully asserts that claim 9 is in condition for allowance.

Since claims 12, 13 and 15 are dependent claims that incorporate the features/limitations of claim 9, Applicant respectfully requests that the rejections be removed.

With respect to claim 17, that claim recites:

17. A system of automatic carrier transfer, comprising:
a first execution module, executing a data verification procedure after a first process operation of a plurality of wafers according to a manufacturing execution system database and obtaining a verification result, wherein the data verification procedure verifies the data between the wafers and the MES database;

a sub-route production module, coupled to the first execution module, dynamically producing a carrier transfer sub-route according to the verification result by accessing first information corresponding to process operations and second information corresponding to carrier transfer operations and then correlating the first information and the second information to generate the carrier transfer sub-route;

a sub-route execution module, coupled to the sub-route production module, executing the carrier transfer sub-route of the wafers; and

a second execution module, coupled to the sub-route execution module, executing a second process operation for the wafers.

(Emphasis Added).

Applicant respectfully asserts that neither *Goerigk* nor *Sada* is legally deficient for the purpose of anticipating claim 17. Specifically, Applicant respectfully asserts that neither *Goerigk* nor *Sada* teaches or otherwise discloses at least the features/limitations emphasized above in claim 17. In this regard, the Office Action indicates that *Goerigk* accesses one data set, whether that data set is stored in one large or two smaller databases. This is in direct contrast to the limitations recited in claim 17, in which two data sets, i.e., first information and second information, are accessed and then correlated to dynamically generate the carrier transfer sub-route. Additionally, although *Sada* may access two databases, the databases do not contain the information recited in claim 17 that is being correlated for the purpose of dynamically producing

the carrier transfer sub-route. Therefore, Applicant respectfully asserts that claim 17 is in condition for allowance.

Since claims 20, 21 and 23 are dependent claims that incorporate the features/limitations of claim 17, Applicant respectfully requests that the rejections be removed.

Rejections under 35 U.S.C. 103

The Office Action indicates that claims 6, 14 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Goerigk* as applied to claims 1, 9 and 17 above, and further in view of *Babbs* (U.S. Patent No. 6,520,727), and that claims 8, 16, 24 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Goerigk*, and further in view of *Sada*. Applicant respectfully traverses the rejections.

In this regard, Applicant respectfully asserts that the cited references, either individually or in combination, are legally deficient for the purpose of rendering obvious the features/limitations recited in dependent claims 6, 8, 14, 16, 22 and 24. Specifically, Applicant respectfully asserts that *Babbs* does not teach or reasonably suggest at least the features/limitations emphasized above in independent claims 1, 9 and 17 that are lacking in *Goerigk* and/or *Sada*. Therefore, Applicant respectfully asserts that dependent claims 6, 8, 14, 16, 22 and 24 are in condition for allowance.

With respect to claim 33, Applicant has amended this claim to recite:

33. A computer-implemented method of automatic carrier transfer, comprising using a computer to perform the steps of:
executing a data verification procedure after a first process operation of wafers according to a manufacturing execution system database to obtain a verification result, the data verification procedure verifying data between the wafers and the MES database;

dynamically selecting a carrier transfer sub-route of the wafers according to the verification result;

executing the carrier transfer sub-route of the wafers; and executing a second process operation for the wafers;

wherein the first process operation and the second process operation are stored in a first database and are selected for processing of the wafers prior to executing the first process operation;

wherein the carrier transfer sub-route is stored in a second database; and

wherein the carrier transfer sub-route is dynamically generated by accessing first information corresponding to process operations and second information corresponding to carrier transfer operations and then correlating the first information and the second information.

(Emphasis Added).

Applicant respectfully asserts that the cited references, either individually or in combination, are legally deficient for the purpose of rendering claim 33 unpatentable. Specifically, Applicant respectfully asserts that none of the references teaches or reasonably suggests at least the features/limitation emphasized above in claim 33. In this regard, the Office Action indicates that *Goerigk* accesses one data set, whether that data set is stored in one large or two smaller databases. This is in direct contrast to the limitations recited in claim 33, in which two data sets, i.e., first information and second information, are accessed and then correlated to dynamically generate the carrier transfer sub-route. Additionally, although *Sada* may access two databases, the databases do not contain the information recited in claim 33 that is being correlated for the purpose of dynamically producing the carrier transfer sub-route. Therefore, Applicant respectfully asserts that claim 33 is in condition for allowance.

Cited Art Made of Record

The cited art made of record has been considered, but is not believed to affect the patentability of the presently pending claims.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

No fee is believed to be due in connection with this Amendment and Response to Restriction Requirement. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

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